

2 September 1982 Vol 1 No 20
35p

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POPULAR Computing WEEKLY

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Telephone 01-839 6835

Published by Sunshine Publications Ltd

Typesetting, origination and printing by Chesham Press, Chesham, Bucks

Distributed by S M Distribution
London SW9 01-274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home: the subscription rate is **£19.95** per year for addresses in the UK, **£37.40** overseas.

How to submit articles
Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programs should, whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article so please keep a copy.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Cover illustration by Stuart Hughes

Editorial

The question of software copyright is rearing its head again. Atari has started a campaign against programs which allegedly infringe the copyright of its *Pac-Man* game.

As part of that campaign, Atari is seeking an injunction against Commodore. Atari is alleging that Commodore's game *Jellymonsters* is an infringement of copyright.

Other software companies, such as Bug-Byte, A and F Software and Micropower, have also been approached by Atari.

There could be severe repercussions for the software industry, if any of these cases come to court. If the court decides that copyright subsists in computer programs, and/or in the images reproduced on a tv screen (*PCW*, August 5), then companies will be forced to develop more original games. Imitations of successful arcade games such as *Space Invaders* will no longer be acceptable.

The establishment of a precedent for software copyright can only be good for the industry. Software firms and writers alike will finally know where they stand in regard to the law.

Next Week



Can you save Beta Strigides from attack by winged reptiles — find out in Pteragon, a new game for BBC

Spectrum software converter

IT is now possible to run ZX81 software on the ZX Spectrum

The new software conversion device is called the Slowloader and is manufactured by East London Robotics

The hardware/software combination is easy to use and allows ZX81 software cassettes to be loaded and correctly interpreted by the Spectrum

A small printed-circuit board is plugged into the I/O port on the rear of the Spectrum The Slowloader machine-code routine is then loaded into the Spectrum in the usual manner The ZX81 cassette is then loaded through a socket on the Slowloader circuit board, rather than through the normal cassette port

Mark Vellacott of East London Robotics explained that the device converts the ZX81 coding as the tape is loading

"The Slowloader," he said, "handles string arrays intelligently — converting them to Spectrum characters — and will also successfully cope with ZX81 machine-code programs providing they do not alter the screen display or define new variables"

The Slowloader will cost about £10 and will be available from the beginning of September

Further information from East London Robotics, Finlandia House, 14 Darwell Close, East Ham, London E6 (Tel 01-471 3308)

Computer grant double boost

INDUSTRY has been given a £37m boost in two new schemes to help it to adopt computer aided design equipment

Information Technology Minister, Kenneth Baker, announcing a £12m plan, said that the need for such investment was urgent Under this first scheme up to a third of the cost of such technology will be met by the government

A further £25m is being provided by the EEC

Trevor Sharples former Laserbug editor

Laserbug tackles its problems

LASERBUG, the London and South-East BBC microcomputer user group has appointed its first full time co-ordinator

Paul Barbour is to be the new organiser who will produce the group's monthly magazine

He will replace Trevor Sharples who has resigned from editorship of the newsletter

Trevor Sharples told *Popular Computing Weekly* that he is now no longer connected with the group having been "forced to give up the club because of time considerations and personnel difficulties"

Only two of the monthly issues — April and May — have so far been received by the group's 2000 members Paul Barbour explained that a joint June/July issue was being sent out A joint August/September issue is to follow He said that every member would have their subscription extended by two months to compensate for the delay

Paul Barbour

Laserbug will continue to operate from its mailing address — 4 Station Bridge, Woodgrange Road, Forest Gate, London E7 There are no plans for Laserbug to have a telephone installed

Sinclair gets going

SINCLAIR Research is giving financial help to a campaign to help create jobs from private enterprise

The company is contributing £1000 of the £10 000 prize money offered to the winner of the *Daily Star* newspaper's 'Get Going' competition.

The 'Get Going' winner will be the individual who comes up with the best idea which could lead to the setting up of a successful small business and the creation of job opportunities

The first prize winner will receive £5000 to help 'get going' and the next 25 winners will each receive £200

Other contributors to the five-figure prize money include British Petroleum, The Confederation of British Industry National Westminster Bank, Plessey, Sainsbury's and the Science and Engineering Research Council

The competition closed on August 31 and the winners will be announced in mid-September

The campaign has received over 4000 entries

Commodore in copyright contest

COMMODORE is to contest the Atari claim of infringement of the *Pac-Man* copyright

The statement from Commodore Business Machines (UK) Ltd says "There are several grounds which are controversial in the Atari claim and Commodore is contesting the case"

In an independent survey recently conducted on behalf of Commodore, the reactions of potential purchasers, under 17 years of age, to the Vic20 *Jellymonsters* and Atari 400 *Pac-Man* were compared

A Commodore spokesman said "Initial results suggest that on several parameters, including graphics, sound and enjoyment, there is an 80 per cent preference amongst consumers towards *Jellymonsters*

"This tends to conflict with the claim of Atari International (UK) Inc that Commodore Business Machines (UK) Ltd is in conflict with consumer interests"

Atari is pressing ahead with its claim for an injunction against Commodore to stop sales of *Jellymonsters*

A spokeswoman for Atari's advisers said "There will be a hearing in October, when Atari will claim injunctive relief against Commodore"

Change in Vic software policy

COMMODORE has adopted a policy of linking its Vic cartridge software to well-known personalities or institutions

The first of these available is Mastermind, marketed by arrangement with the BBC and with questions set by the BBC Mastermind co-ordinator, Boswell Taylor

Next month will see a cookery package from Robert Carrier and a personality testing program from Professor Eysenck

Future plans involve a version of Ask the Family, again by arrangement with the BBC, and a link up to produce educational software in conjunction with the publishers, Hodder and Stoughton



This is a full forty key moving keyboard with real keys that fits in the recess left after peeling off the existing touch sensitive membrane keypad

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Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Wash a matter with you baby?

In *PCW* July 29 Mr Vale responds to an earlier letter of mine regarding the merits of the BBC micro and the ZX Spectrum. He implies that the Spectrum, at its price, can satisfy computer enthusiasts needs.

Some people may prefer the Spectrum and I will not deny that it offers many fine features at an economical price. However, there are other people who consider it worthwhile paying more for the BBC micro's adaptability and extra computing facilities.

I had not thought of controlling a washing machine by my BBC, but Michael Vale has just given me a good idea.

R Lober
Rivendell
13 Pwll-y-min Crescent
Peterston-super-Ely
Cardiff CF5 6LR

Mown down by moans?

I am writing with a moan or two about the Screen $ function on the Spectrum.

This function is not satisfactorily explained in the manual. When used, it will yield a null string for any graphic symbol, including user defined ones, making the use of these symbols in games almost pointless.

There is also a bug with the following program.

```
10 PRINT AT 0,0;"•"
20 LET X=5
30 LET X=X+CODE SCREEN$ (0,0)
40 PRINT X
```

This will give an answer of 42, not 47 which is the correct answer. But, if you change line 30 to

```
30 LET X=CODE SCREEN$ (0,0)+X
```

the program works. Note that the bug has nothing to do with the brackets.

My second moan is about your editorial. Does the person who writes it work for your magazine? The points raised are very interesting and I agree with many of them, but you do not follow your own example.

In *PCW* July 29 your editorial made the point about old ideas being "re-hashed" and submitted. In that very issue there is a mastermind program. Now, if there is a ZX81 owner in the world who has not already seen 20 mastermind programs in various publications, I would like to meet him.

On page 19 of that issue there is a maths quiz program. Again, this is a (yawn) well tried program. On page 15 there is a program to define Spectrum graphics. An almost identical program appeared in the previous issue.

In your defence, you have published some excellent routines for the Spectrum (eg the 3D graphics in issue 12) but I feel you do tend to preach somewhat.

PS I would contact the other *PCW*. Twice they have said to have "World exclusive" reviews of machines which your magazine had already reviewed ie Spectrum and now the Dragon.

Stephen Kelly
50 Hinton Crescent
Appleton
Warrington WA4 3DF

You are quite right, we do not always follow our own example, but we do try. In the case of Open Forum programs we have been encouraging readers to be more original and adventurous in their ideas. But, the majority of programs that we receive are still based around common games such as mastermind. Rather than disappoint all these readers, we publish a few of these types of games together with as many new and interesting programs as possible.

Or just a white elephant at large?

Like many microcomputer users, I own a teletext tv receiver. Now you may be aware that both the ceefax and oracle services broadcast telesoftware. Unfortunately, it is limited to that overpriced never delivered BBC computer.

To date, only 14 100 model A and only 9 600 model B BBC computers have been distributed (a fact verified by the computer newsletter published on page 705 of ceefax). Surely such a piffling amount is not enough to ensure a monopoly in the telesoftware output.

Why can we not see examples of pages written in Sinclair Basic, surely the most widely used language in the home computing world. After all, half a million ZX81 computers and more than 20,000 Spectrums have been sold already in this country.

I am quite sure the BBC will say that they do not have enough pages on their teletext service to cater for any other software. The real reason being that they are unable to admit that their computer is rapidly becoming a white elephant in the light of the excellent low priced computers being produced, and under development.

Could you not ask your readers to pester the BBC with a view to getting such programs broadcast. After all, we are missing out on a fantastically useful service. The programs which I have painstakingly transposed to Sinclair Basic seem to be of very high quality.

Nigel Cummings
486 High Street
West Bromwich

If you read *PCW* July 29 you will see that Sinclair are developing a Prestel adaptor for the Spectrum. It will cost less than £100 and should be available in the first half of next year. Consequently, there will also be a range of Spectrum telesoftware available next year.

Software manufacturers can sell their programs through Prestel by contacting British Telecom on Freephone 2043.

Log jam brings cash rewards

In response to the many queries which, I understand, your magazine has received, I would like personally to explain the current delivery situation for our new ZX Spectrum personal computer.

The general public's response to our new computer has far exceeded our expectations and we have been 'swamped' with orders. This, and some small initial production delays, have led in turn to considerable delays in delivery.

Regrettably, many of our customers may have to wait up to 12 weeks, from our receipt of their order, for delivery of their Spectrum. We are writing to them all to apologise for the inconvenience and to offer them the chance of an immediate refund.

For those customers who continue to wait, we shall be sending out with each Spectrum, in compensation for the delay, a £10 voucher, which can be used in part-payment for a ZX Printer or to buy a complete pack of five rolls of printer paper.

We are also providing customers with a new demonstration tape containing:

1) A complete 'keyboard trainer' to introduce the Spectrum
2) Three major programs — an exciting game Through the Wall, a drafting program Draw and Character Generator which demonstrates user defined graphics.
3) A series of illustrative programs — Bubble Sort, Evolution, Life, Monte Carlo and Waves.

Finally, I would like to assure you and all our customers that the initial problems with the Spectrum have now been completely overcome. Production is running smoothly at 5,000 units per week and will rise sharply over the coming months. We are confident that our present backlog will be cleared by the end of September and hope that you will see current delays in the context of our successful delivery of more than 500000 computers in the last two years.

Clive Sinclair
Sinclair Research Ltd
23 Motcomb Street
London SW1X 8LB

If you have an opinion you want to express or have spotted an error that needs correcting write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

COVER STORY

Under pressure

A new game for 16K Spectrum by Simon Lane



You are a marine engineer, working on the Yoshima oil rig in the North Sea. Your main task is to carry out underwater inspection and maintenance of the pipe lines carrying the oil from the rig to a refinery in Scotland

Instruments monitoring the oil flow indicate that the main pipe line has sprung a leak, about 1000 metres away from the Yoshima rig You are despatched in a propeller-driven diving bell to investigate the leak

Cruising just above the pipe line looking for the tell-tale black wisps that denote a leak, you suddenly become aware of a strong smell of smoke Turning round you see that your engine has caught fire. Grabbing the chemical fire extinguisher from under your seat, you douse the engine in a mass of foam

With the fire out, the immediate danger is over but the engine is a twisted heap of burnt-out wire and metal You are trapped on the sea-bed

Fortunately, the diving bell is equipped with an aqualung and a wet-suit. However, as you are putting on the aqualung you notice that the air cylinder seems strangely light On checking the cylinder's gauge, you discover that it is virtually empty

With the air inside the diving bell starting to become stale you have few choices Entering the air lock, you flood it with water and open the outer hatch You must attempt to swim to the surface before your air runs out But if you rise too fast you will suffer from "the bends and die from decompression

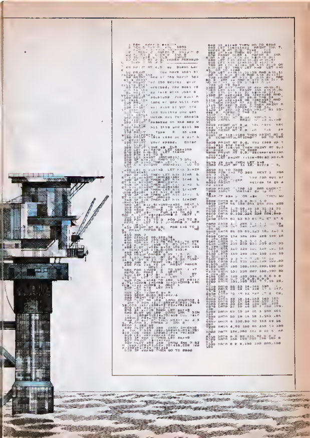
When you have loaded and run the program, a man in a wet-suit will appear on the screen Two dials will also appear on the top of the display indicating your depth and the amount of air you have left

Type "Ø to use your flippers This uses more air, but doubles your speed

You must watch out for shoals of fish and clumps of seaweed on your way up Hitting either of them will delay your ascent.

A flashing square appears beside the oxygen dial when your air supply is almost exhausted The key to the game is to keep rising slightly faster than your air supply diminishes

If you reach the surface the computer will tell you how long you took and give you a percentage score based on your time and your remaining air My best score so far is 63 percent Can you beat it?



Born in a pub brewed in a kitchen

***David Kelly** talks to David Paterson, a founding partner of Silversoft*

David Paterson is a volatile Glaswegian with a wrist watch that plays *Scotland the Brave* He is also one of the partners in the software company Silversoft

After leaving the University of Strathclyde he worked first for a shipyard and then for a brewery "I found the product much more satisfying'

The Silversoft venture began as a hobby "A buddy and I were sitting in a pub," he explained, "thinking we must get a computer and trying to work out how to pay for it So we thought we'd write some programs for the ZX81

This was in the summer of 1981 "Some of the software at that time was abysmal and we thought we might be able to do better"

The first game they wrote was a 16K version of *Star Trek* "The big day came We made the tapes placed the adverts and sat back biting our nails waiting to see what would happen

'And then the money started rolling in — we were staggered by the response They recovered the cost of their advertising in the first week.

"At first we recorded all the tapes in my kitchen at home I was working all through the night knocking the things out and then doing a full-time job in the daytime We soon realised that the tapes would have to be manufactured professionally I was down to six and a half stone and couldn't go on '

Silversoft had 500 tapes made The tapes sold quickly and the business has never looked back

The company specialises in games tapes for the home consumer David does not think that there is a business market for the ZX machines and thinks most utility programs are a waste of time ' They don't do anything you couldn't do quicker on a piece of paper That's why we make games — besides it is fun

David reckons there are three types of software manufacturers dedicated professionals in it for the money, enthusiastic amateurs out to spread the word about computers and egotistic technocrats who think it is *flashy*

"I'll let you guess which I think I am," he grinned

David Paterson

"Despite our different approaches we have all got the same problems Our single biggest worry is piracy There is not a lot you can do about it either — apart from keeping your eyes open It is particularly annoying to look in the classified ads and see the program you spent six weeks writing being sold under a new name at half the price

' Recently we have been noticing the effect of software libraries. They buy our tapes and then rent them out. All perfectly legal, but, in the end the user loses out. What is the point in trying to write a good program only to have it bought by the libraries and loaned out?"

Another major concern at the moment is the proliferation of machines ' All the main electronics companies are jumping on the bandwagon and launching new products often with no software back-up A machine is useless without programs to run on it. Most software companies will not have the resources to cope with all these new micros

"Everyone thinks there are big profits to be made in software — one magazine recently suggested in its editorial that it costs 22p to produce a tape This just isn't true

"Suppose the price of the cassette is £5 Post and packing — about 40p — and VAT — 75p — come off first The tape probably costs 60p to produce, including the cost of the insert and instructions And one can expect to pay 20–25 percent royalties — say £1.25

"That only leaves £2 From that comes handling charges and advertising A company can easily spend more than £1500 per month on, say, six half-page ads To recoup that cost you would need to sell more than 750 tapes each month

"Then there are hidden costs like rent, rates electricity and telephone Finally there is kit We have two ZX81s, two BBCs two Spectrums and umpteen tape recorders We burn them up like they're going out of fashion — you have got to have at least two of everything in case one blows up

"So far we haven't begun to consider profit

"At any time we have a considerable investment in tapes and in a market that changes so quickly as this one it is quite easy to burn your fingers When the Spectrum came out all our ZX81 stock died '

Drop-out

The games that Silversoft now produce are mainly versions of well-known arcade programs New games apparently do not sell — people always go for the devil they know "We had a great game called *Drop-out*,' said David, "and it did just that — because no one knew what it did "

Now that Atari are beginning to take action over alleged copyright infringements, software companies may be forced to produce more material based on their own original ideas "If that happens," says David "marketing will become the big problem

"The law in this area is very confused We even had one guy who said we ripped-off his program by using the commands Back, Forward Left and Right What are we supposed to use — Retreat, Advance Port and Starboard?

"You have to accept that the copyright uncertainty is part of the game We hope that it is OK providing the program is not an exact copy — It is the nature of the industry

"There are lots of different versions of most games — but some are far superior to others We just have to make sure that ours are some of the superior programs "

What's happening

Thames Valley ZX81 and Spectrum User Group is being formed to cover Slough, Reading, Windsor and Bracknell Those interested should contact Richard Shepherd, 22 Green Leys, Maidenhead, Berkshire (Tel 0628 21107)

Interschool Christian Fellowship runs a selection of micro adventure holidays Contact Mrs K Bacon, 26 Mays Road, Wokingham Berks (Tel 0734 792569)

Peter Garrard takas a comprehensive look at the Commodore 64.

Will you sti me now I'm

In appearance the Commodore 64 is very similar to the well-known Vic20 It has the slightly layered keyboard seen on the new Vics The four function keys are also there

Similarly the by-now familiar and oft-imitated Pet graphice symbols are all there

Most micros that have been announced over the last few months, and there have been many newcomers on the scene lately, have been remarkably similar in performance and price No new outstanding features have emerged in any of them Even the Spectrum, subject of such furore around the industry when it first appeared, has now lost some of its initial glamour

The Commodore 64 has a number of capabilities that make it stand out, but in the long run the deciding factor will be the price The reason why the ZX81 did so well was its extremely low cost.

Commodore will be pricing the 64 at around £299 plus VAT making a total of £350 This compares with a price of £199 plus VAT for Commodore s Vic20

No computer, other than the BBC micro, has attempted to come to gripe with musical synthesis on a big scale Even on the BBC machine, envelope shaping is not the easiest of tasks Admittedly you could pay £15000 and acquire an amazing purpose-built machine, but the home market has been lacking such features, until now

The Vic20 started the trend, with three voices and a white noise generator Clive Sinclair took a step backward whh the Spectrum s *Beep*, but the Commodore 64 redresses the balance

Inside the 64 is a chip known affectionately as Sid (Sound Interface Device?) It is this chip that controls all sound output on the 64 and it has some quite remarkable powers Basically, you have control over three independent voices, each of which has the following capabilities

1) A nine octave range from 0 059Hz to 3 9Hz, in steps of 0 059Hz

2) Four different waveforms (sawtooth, triangle, variable pulse and noise)

3) Amplitude modulation and ring modulation.

4) Programmable addressable envelope generator

5) Oscillator synchronisation

There is a programmable filter individually selectable for each voice, and, as on the Vic20 volume control from within the software

Using the accompanying documentation, which in his preliminary stages at least looks very good, control of the sound is quhe easy Certainly true synthesis is not at all difficult. You will soon have the living-room reverberating to the Brandenburg Concerto or Goody-Goody Two Shoes for that matter

You can achieve very close approximation to the timbre of a whole host of musical instruments, several of which can be played at once I suspect that it will not be too long before Commodore or someone else, comes out with a superb piece of software to facilhate the production of musical pieces Our News Desk will keep you informed of any developments

Most micros coming on to the market make great play about their graphic capabilities both in terms of resolution and colour It is of course, possible to buy add-on packages to enhance existing features, but it is the basic machine that counts The Commodore 64 has an impressive performance in this field

Full resolution is 320 by 200 pixels, using a 40 column by 25 row screen Thus teletext is now at your command providing someone brings out the appropriate interface

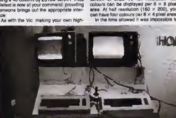
As with the Vic making your own high-resolution characters can be done with the aid of data statements from within a Basic program You create your characters on a matrix grid of 24 by 21 pixels The character that occupies that space is known as a sprite

On any given horizontal line you can have up to eight sprites displayed But, by careful use of the interrupt capabilities of the video controller, you can have as many as 256 sprites displayed simultaneously on the screen

Quite superb graphical displays can be produced To list just some of the capabilities of the video controller positioning of a sprite is done by specifying an X — Y register, there are routines for expanding sprites and filling in the background, routines for collision detection and so on No longer need *Tempest* be restricted to the amusement arcades

The Commodora 64 has 16 different colours which can be displayed on the screen at once At full resolution two colours can be displayed per 8 × 8 pixel area At half resolution (160 × 200), you can have four colours per 8 × 4 pixel area

In the time allowed it was impossible to



American Commodore 64 model shown at 3rd International Commodore Computer Show June 3-5

Il love 64?

put the 64 through its full paces but we did discover that it can support a large number of peripheral devices With cassette interface, serial interface and 8-bit parallel user ports on board, this is hardly surprising In addition, it has memory expansion and cartridge ports, and is capable of supporting two joysticks and four paddles It can also handle any of the existing Vic peripherals

Even more exciting, the 64 can run any software written for any other 40 column Commodore machine This is done quite ingeniously, by altering the memory mapping system

other microcomputers attempting to enter the market

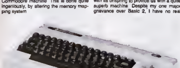
The 64 has 20K of Rom on board, including 8K Basic and 8K Kernal as in the Vic and 64K of Ram Of this Ram 40K is directly useable from Basic with the top 24K being accessed from within the machine code Even if you know nothing about machine code, 40K is sufficient space to roam around in

However, the 64 does have one major failing Why, oh why does it still have Basic 2 0 on board?

Basic 4 has been around for quite some time now and Basic 5 has been rumoured for almost as long So why on earth stick to an old, outdated version of the language? Admittedly, it is not going to make any difference for a lot of applications, but I thought we had said goodbye to garbage collection long ago Oh well, we must assume Commodore has its reasons

Summary

The 6502 has been and gone We are left with its offspring to provide us with a quite superb machine Despite my one major grievance over Basic 2, I have no real





Commodore 64 soon to be on sale in the United Kingdom.

An outstanding feature of the 64 is that it can accept a second processor (eg a Z80), which allows you to run CP/M based software This is quite good — as we have said before any microcomputer is really only as good as the software that is available for it, so the more software the better

Software advantage

There is a vast array of programs for the Pet written in Basic Now that we can also gain access to CP/M software as well the number of packages already in existence for the Commodore 64 is enormous This will give it significant advantages over

hesitation in recommending the Commodore 64 to anyone It will cost slightly more than some of the other new micros but the extras you get more than make up for this

The 64 already has a rich ground-base of software It is easy to use for anyone remotely familiar with Commodore's own implementation of Basic and the new facilities are all straightforward enough The documentation is adequate and may be even better when the final model appears

We were originally told to expect a delivery date of January 1983 but it looks like Commodore is making great efforts to bring this forward by a few months

ZX-Galaxians

Artic Computing, 396 James Reckitt Avenue, Hull
ZX81, 4K, cassette
Price £3 95

ZX-Galaxians is based on the arcade game of the same name The program loaded first time in about one and a half minutes and runs automatically

After the title and copyright message appear there follows a description of the game

It starts after pressing any key, upon which an array of four rows of eight Galaxians appear, along with your base The Galaxians each score 10 points in the convoy, and 20 when they dive Unlike the arcade version there is only one type of Galaxian, represented by the letter V when in convoy, or by three pixels when diving Your base is formed from several pixels, it is moved by pressing 5 and 8 and 0 fires

The graphics are adequate but crude and there appears to be no relationship between your score and the speed and frequency of the diving aliens The 'continuous status report' referred to on the cassette inlay is just a box displaying the score, hi-score, base count and instructions This takes up most of the right-hand quarter of the screen and would be better dispensed with and replaced by more imaginative graphics

Each player is given three bases When hit by a Galaxian missile the base disintegrates in a suitably graphic explosion

The top scorer can input six letters or numbers of his choice, enabling him to satisfy his desire for temporary immortality

The game is also available from W H Smith paired with a program called Sword of Peace, price £4 95

Sword of Peace is a text-only adventure game, written in Basic and is extremely slow, even in the *Fast* mode

The object of this game is to collect four 'Objects of State' from a four-level castle You are allowed a number of spells with which you can destroy evil monsters Each time you cast a spell or a spell is cast against you, a certain amount of energy is lost If your energy decreases below zero, you die

Summary

ZX/Galaxians is smooth-running and difficult, despite faults One would be hard-pressed to describe it as imaginative, though.

Sword of Peace is interesting for five or six games but, with its lack of speed and text restrictions, it soon becomes boring, although it has novelty value

The decision whether to buy one game for £3 95 or two games for £4 95 is yours

AE

Open Forum

Open Forum is for you to publish your programs and ideas.
It is important that your programs are bug free before you send them in. We cannot test all of them
Contributions should be sent to: Popular Computing Weekly, Hobhouse Court,
19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.
(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette

The program will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing

Please enclose a stamped, self-addressed envelope

Binary

on Spectrum

For ZX81 and Spectrum users this program, which gives the binary and hexadecimal conversions of a decimal input, should be useful for both graphics and m/c needs.

In the Spectrum manual, chapter 14 holds a program for inputting your own graphics requiring a *Bin* input. You can though, enter the decimal equivalent, thus saving three keystrokes per entry, a total of 24 key strokes per user character.

Putting the program in a loop of 0 to 255, and deleting the input on line 30 will give a look up table. The resulting error code for screen full may be answered with *Cont n/l* for more of the loop.

Alternatively replacing the *Print* in 95 with *Lprint* will give the complete list.

Program notes
Lines 1 Initialises the hex characters.
5-25 sets bit values of binary 11111111
40-45 initialise binary characters.
60-79 division of input by bit values of binary 255
sub 105 records result of division
85-90 calculate hex characters from Bs.
95 prints input, binary hex

```
  1 LET B$="0123456789ABCDEF"
  5 DIM A(8)
 10 LET A(1)=128
 15 FOR N=2 TO 8
 20 LET A(N)=A(N-1)/2
 25 NEXT N
 30 INPUT L
 35 IF L<0 OR L>255 THEN GO TO 30
 40 LET A$="00000000"
 45 LET H$=""
 50 LET X=L
 55 LET Y=L
 60 FOR N=1 TO 8
 65 IF INT (X/A(N))=1 THEN GO SUB 105
 70 IF X=0 THEN GO TO 80
 75 NEXT N
 80 LET X=L
 85 LET H$=H$+B$(1+INT (X/16))
 90 LET H$=H$+B$(1+INT ((X/16)-INT (X/16))*16))
 95 PRINT L,TAB 5,"=",TAB 8,A$,TAB 17,"=",H$
100 GO TO 30
105 LET A$(N)="1"
110 LET X=X-A(N)
115 RETURN
```

Binary
by D Wieckowski

Plotter

on Spectrum

This program enables the ZX Spectrum user to be able to draw a picture of his own design on the 256×175 pixels available to the user.

The controls are as follows:

S Clears the whole screen
Q W E
A D Movement keys, move curser on screen in direction Z C of key being pressed in relation to the S key
Y Pressing this key makes the computer ask you for the radius of a circle around the curser
U This key when pressed allows you to change the colours of *Border*, *Paper*, *Ink* while still running the program
O Allows you to move the curser around without leaving a trail
I This key returns the curser to normal mode so that it again leaves a trail

Design of program
1-5 Sets up variables
10 Gosubs 300 to set up colours to be used
80-200 Checks and acts if any keys are being pressed
210-227 Checks more keys and *Gosubs* the subroutines to change the colour, the values of the variables and the circle routine
230-245 These lines do the plotting and the unplotting. These also stop the program from corrupting off the edge of the screen
300-370 These lines ask what colours are to be used and sets them
400-420 This subroutine prints the circle on the screen

Variables used

a = Number to be added to x variable (x coordinate)
b = Number to be added to y variable (y coordinate)
x = Variable used for x coordinate
y = Variable used for y coordinate
e = Variable used to determine whether the curser is to leave a trail
a$ = String used to contain the value of *Inkey$*
i = *Ink* colour
p = *Paper* colour
s = Screen colour
c = Radius of circle

PROGRAM OF THE WEEK

```
  1 LET a=0
  2 LET x=100
  3 LET b=0
  4 LET e=0
  5 LET y=90
 10 GO SUB 300
 70 CLS
 80 LET a$=INKEY$
 90 IF a$="a" THEN LET a=a-1
100 IF a$="d" THEN LET a=a+1
110 IF a$="x" THEN LET b=b-1
120 IF a$="w" THEN LET b=b+1
130 IF a$="[illegible]" THEN LET [illegible]
140 IF a$="[illegible]" THEN LET [illegible]
150 IF a$="[illegible]" THEN LET [illegible]
160 IF a$="[illegible]" THEN LET [illegible]
170 IF a$="[illegible]" THEN LET [illegible]
180 IF a$="[illegible]" THEN LET [illegible]
190 IF a$="[illegible]" THEN LET [illegible]
200 IF a$="[illegible]" THEN LET [illegible]
210 IF a$="s" THEN CLS
220 IF a$="o" THEN LET e=1
225 IF a$="i" THEN LET e=0
226 IF a$="u" THEN GO SUB 300
227 IF a$="y" THEN GO SUB 400
230 IF e=1 THEN PLOT OVER 1;x,y
232 LET x=x+a: LET y=y+b
235 LET a=0: LET b=0
237 IF x=-1 THEN LET x=0
239 IF y=-1 THEN LET y=0
240 IF y=176 THEN LET y=175
242 IF x=256 THEN LET x=255
245 PLOT x,y
250 GO TO 80
300 INPUT AT 0,0;"ink";i
310 INPUT AT 0,0;"paper";p
320 INPUT AT 0,0;"border";s
330 PRINT AT 0,0;"  "
340 INK i
350 PAPER p
360 BORDER s
370 RETURN
400 INPUT c
410 CIRCLE x,y,c
420 RETURN
```

Plotter
by M Luscombe

Fine Scrolls

on Spectrum

The Fine scrolls program is really a pair of machine code routines that can be used to great effect in a *Basic* program. They will each scroll the whole, or part of the screen to either left or right.

To scroll to the right, *Randomize usr* 23760 is used, and this will move the whole screen to the right by one high resolution pixel. *Randomize usr* 23798 will do the same, but moving it all to the left.

When entering the program, make sure there are 32 characters after each *Rem* in lines 1 and 2. *Run* the program, then delete lines 10 to 5004. Add these lines as a demonstration.

```
10 FOR G=16 TO 78 STEP 16:CIRCLE 128,87,G:NEXT G
20 FOR G=0 TO 255:RANDOMIZE USR 23760:NEXT G
```

When this is run, a set of concentric circles are drawn, which then scroll to the right and off the screen. Replacing the *Usr* call by 23798 will make them scroll to the left.

It is possible to scroll one third of the screen at a time. Here is a table of the changes needed.

	(Scroll Right)		(Scroll Left)	
	Line	Line	Line	Line
Item of data	1000	1002	2000	2002
to be changed	Item 3	Item 1	Item 3	Item 6
Scroll all screen	64	66	64	66
Scroll top third	64	72	64	72
Scroll middle third	72	66	72	66
Scroll lower third	80	66	64	88
Scroll top two thirds	64	60	58	80
Scroll lower two thirds.	72	66	72	64

You can arrange this so that the two routines work on different parts of the screen, as the two data changes in lines 1000 and 1002 do not affect the scroll left routine, and the changes in 2000 and 2002 do not affect the scroll right routine.

Compare these routines with the usual scrolling on the Spectrum. It is obvious at a glance that these are more elegant; what may not be so obvious is that they provide more power over your screen.

```
   1 REM zzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz
   2 REM zzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz
  10 FOR a=23760 TO 23778: READ a: POKE a,a: NEXT a
  20 FOR a=23798 TO 23824: READ a: POKE a,a: NEXT a
 997 REM
 998 REM    SCROLL RIGHT
 999 REM
1000 DATA 33,0,64,14,32,175,183
1001 DATA 31,119,35,13,32,249,64
1002 DATA 80,168,32,241,201
1997 REM
1998 REM    SCROLL LEFT
1999 REM
2000 DATA 33,31,64,32,0,38,55,14
2001 DATA 33,176,126,23,119,43
2002 DATA 13,32,249,28,58,88,164
2003 DATA 48,3,43,84,235,201
5000 REM
5001 REM
5002 REM    FINE SCROLLS
5003 REM
5004 REM
```

Fine Scrolls
by Bill Longley

Road Race

on ZX81

This is a game for the ZX81 with at least 5K of memory. The game incorporates some machine code to animate the graphics. The listing is given in two parts — the *Basic* and the machine code.

To enter the m/c first type in line 1 as a *Rem* statement of 49 "X"s. Then type as a direct command *Poke* 16510, 0. This makes the *Rem* line 0. Now enter the m/c loading program given and enter the code. Delete lines 9000 onwards and enter the *Basic* program.

This is a road-race type game, you are driving the $ on the track and can control he movement left or right with keys 5 and 8. The road will move down towards you and you will pass other cars which you must avoid. If you hit another car or go off the track you crash very spectacularly. Your score and the high score is displayed. The display uses all 24 lines and is totally flickerfree.

The program uses two machine code routines. The first from 16514 to 16543 is a very simple routine which scrolls the whole display down one line. This is used to create the moving track. The second, from 16544 to 16562 inverts the video and is used to create the spectacular crash.

Parts of the *Basic* program are repeated once for straights, and once for corners. I decided to use this method rather than a subroutine as the latter tended to slow down the speed of the game.

Program notes
Line 0 Machine code
Lines 2-80 Set up display and initialise.
Line 100 Decide whether a curve
Line 110 Call SCROLL DOWN routine
Line 141 Check for crash
Line 170 Decide whether to display opponent's car (INV 5)
Line 500 Decide length of curve.
Line 510 Decide direction of curve
Lines 515-590 As lines 110 to 170 but for curved track
Lines 1000 to 1060 Crash and display score
Lines 2000 onwards Instructions and skill level

```
   1 GOTO 2000
   2 LET HS=0
   3 REM ROADRACE - 4K BASIC/MC
        (C)1982 BY BRIAN CADGE
   4 RAND
   5 CLS
  10 LET X=14
  11 POKE 16418,0
  12 PRINT AT 21,0;"HI SCORE ";H
S;AT 22,0;
  13 POKE 16418,2
  14 PRINT AT 20,0;
  20 FOR I=1 TO 19
  30 PRINT AT I,0;"UUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUU";AT I,11;
  40 NEXT I
  50 PRINT AT 0,0;"UUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUU"
  60 LET L=11
  70 LET TI=0
  80 REM START
 100 IF RND>.8 THEN GOTO 500
 110 LET A=USR 16514
 120 PRINT AT 1,L;
 130 PRINT AT 11,X;
 140 LET X=X+(INKEY$="8")-(INKEY
$="5")
 141 IF PEEK (PEEK 16396+256*PEE
K 16397+331+X)<>136 THEN GOTO 10
00
 145 LET TI=TI+1
 150 PRINT AT 10,X;"$"
 170 IF RND<SK THEN PRINT AT 1,R
ND*5+L;
 180 GOTO 100
 500 LET G=INT (RND*8+3)
 505 LET Q=1
 510 IF L>14 THEN LET Q=-1
 515 FOR F=1 TO G
 520 LET A=USR 16514
 525 LET L=L+Q
 530 PRINT AT 1,L;
 540 PRINT AT 11,X;
 550 LET X=X+(INKEY$="8")-(INKEY
$="5")
 552 IF PEEK (PEEK 16396+256*PEE
K 16397+331+X)<>138 THEN GOTO 10
00
 555 LET TI=TI+1
 560 PRINT AT 10,X;"$"
 580 IF RND<SK THEN PRINT AT 1,R
ND*5+L;
 590 NEXT F
 600 GOTO 100
1000 PRINT AT 10,X-1;"* ."; AT 11
,X-1;"*"
1005 FOR F=1 TO 20
1006 LET C=USR 16544
1007 NEXT F
1010 POKE 16418,0
1015 IF TI>HS THEN LET HS=TI
1020 PRINT AT 21,0;"HI-SCORE ";H
S;" SCORE ";TI;AT 23,5;"ANOTHER G
AME (Y/N)"
1030 POKE 16418,2
1040 IF INKEY$="Y" THEN GOTO 0
1050 IF INKEY$="N" THEN STOP
1060 GOTO 1040
```

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```
2000 REM INSTRUCTIONS
2010 PRINT AT 20,6,"ROAD - RACE"
,AT 21,0,"********HOW TO PLAY***
*********"
2030 PRINT AT 0,0,"THE ONLY INST
RUCTIONS YOU NEED  ARE
2040 PRINT "... 5 ... MOVE LEFT,
8 ... MOVE RIGHT ..."
2050 PRINT "YOUR CAR IS THE "8"

2060 PRINT "YOU MUST AVOID THE O
THER CARS   WHICH APPEAR AS A
"
2070 PRINT
2080 PRINT "ENTER SKILL LEVEL (1
TO 5)?"
2090 INPUT SK
2100 IF SK 1 OR SK>5 THEN GOTO 2
090
2110 LET SK=SK 10
2120 GOTO 2

16514 2A 0C 40 11 78 02 19 E5
16522 06 21 23 10 FD E5 D1 E1
16530 0E 13 06 21 7E 10 10 25
16538 19 FA 0D 20 F5 C9 06 16
16546 2A 0C 40 23 7E FE 76 20
16554 05 C6 80 77 10 F5 10 F3
16562 C9

9000 LET A$=""
9010 FOR A=16514 TO 16582
9020 IF A$="" THEN INPUT A$
9030 SCROLL
9040 PRINT A,A$( TO 2)
9050 POKE A,16*CODE A$+CODE A$(2
)-476
9060 LET A$=A$(3 TO )
9070 NEXT A
```

HI SCORE 25

by Brian Cadge

Block Graph

on Vic20

First of all the computer will ask you how many columns wide you want the graph and what you want to call it. You will then be asked the size of each column.

After this data has been inputed the computer will ask you what colour you want each column to be. To do this simply press the colour keys on the top row of the keyboard.

Variables are:
C number of columns
Q(C) stores the height of each column
T *For-Next* variable, counts from 1 to the number of columns
CC(T) stores the colour of each column
A miscellaneous *For-Next* variable

```
5 POKE36879,8 PRINT"♥"
10 PRINT"▮BLOCK GRAPH PROGRAM▮"
20 PRINT"▮NO. OF COLUMNS "
30 INPUT C
40 DIMQ(C)
50 PRINT"WHAT DO YOU WANT TO "
60 PRINT"CALL IT"
70 INPUT NM$
75 DIMQ(C) FORT=1 TO C
80 PRINT"▮HOW MANY BLOCKS HIGH"
90 PRINT"DO YOU WANT THE ",T,"COLUMN
   TO BE."
100 INPUT Q(T)
110 NEXT T
120 DIMCC(C)
130 FORT=1 TO C
140 PRINT"▮WHAT COLOUR DO YOU "
150 PRINT"WANT THE ";T,"COLUMN"
160 PRINT"TO BE"
170 INPUT CC(T)
175 CC(T)=CC(T)-1
180 NEXT T
990 PRINT"▮▮",NM$
1000 FOR A = 1 TO 18
1010 POKE 7601+A*22,106
1020 POKE 38401+A*22,1
1030 NEXT A
1040 FOR A = 1 TO 18
1050 POKE 8099+A,119
1060 POKE 38819+A,1
1070 NEXT A
1075 N=N+1
1080 FOR Y=0TOQ(N)
1090 POKE 8078+(N-1)-(Y*22),160
1100 POKE 38798+(N-1)-(Y*22),CC(N)
1110 NEXT Y
1120 IF N<C THEN 1075
1130 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮1
     23456789111111111"
1140 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮
     ▮▮▮▮▮▮▮▮▮012345670"
1150 FORA=1TO15000 NEXT
1160 PRINT"▮▮▮▮▮▮▮▮▮▮WANT TO DO
      ANOTHER ?"
1170 GETA$ IFA$=""THEN1170
1180 IFA$="Y"THEN RUN
1190 PRINT"GOODBYE."
```

Renumber

on ZX81

You have just typed a great program into your computer and are about to send it off to a magazine. You type *List* but to your horror the line numbers go in odd jumps and steps.

Now you have no need to worry — just add lines 9000 to 9011 to your program, type *Run* 9000, key in the step and start for the renumbering, wait a bit and your program will be renumbered.

RENUMBER

```
9000 PRINT "STEP?,START?"
9001 INPUT S
9002 INPUT L
9003 LET A=16509
9004 POKE A,INT (L/256)
9005 POKE A+1,L-256*INT (L/256)
9006 LET A=A+1
9007 IF PEEK A<>118 THEN GOTO 90
06
9008 LET A=A+1
9009 LET L=L+S
9010 IF PEEK A*256+PEEK (A+1)=90
00 THEN STOP
9011 GOTO 9004
```

by Chris Callender

Equations

on ZX81

This program is for those who haven't quite mastered the solving of

$$ax^2+bx+c=0$$

The program will fit into 1K quite easily but by using a machine code call to the scroll routine as part of a print statement, a good whole screen display is achieved

Program notes

Line 10 assigns the address of the scroll routine to the variable S
Lines 20-80 print an introduction and input the values of a b and c
Lines 90 and 100 check if it is possible to solve the equation without using complex numbers and if not restart the program with a request for another set of values
Line 110 solves the equation using

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Lines 150 and 160 provide an automatic start up on Loading

```
10 LET S=3085
20 PRINT CHR$ (USR S+USR S),"\:C
HR$ (USR S+USR S), "SOLUTIONS TO
AX**2+BX+C WHERE",CHR$ (USR S+US
R S),TAB PI*PI,"A = ",
 30 INPUT A
 40 PRINT A,CHR$ (USR S+USR S),
TAB PI*PI,"B = ",
 50 INPUT B
 60 PRINT B,CHR$ (USR S+USR S),
TAB PI*PI,"C = ",
 70 INPUT C
 80 PRINT C,CHR$ (USR S+USR S),
 90 LET X=B*B-4*A*C
100 IF X<0 THEN GOTO 130
110 PRINT "ARE, X = ",(-B+(SQR
X))/(2*A),CHR$ (USR S+USR S),"OR
, X = ",(-B-(SQR X))/(2*A)
120 GOTO 20
130 PRINT "ARE NOT REAL."
140 GOTO 20
150 SAVE "QUADRATIC█"
160 RUN
```

```
SOLUTIONS TO AX**2+BX+C WHERE
          A = 1
          B = 2
          C = -4
ARE, X = 1.236068
OR,  X = -3.236068

SOLUTIONS TO AX**2+BX+C WHERE
          A =
```

Equations
by Tim Gilberts

Polypen

on Vic 20

This is a polyphonic stylophone program using the Vic light pen. Point the pen at a position along one of the four horizontal lines. Touching the sensors initiates the tone, moving the pen horizontally changes the pitch.

The four lines correspond to the four Vic voices. To stop tones point pen at left-hand-most column, touch sensors and hit any key

```
5 REM POLYPEN BY          R.BARTON.
10 DEFFNX(X)=INT((PEEK(36870)-49)/4) DEFFNY(Y)=INT((PEEK(36871)-32)/4)
20 PRINT"?"
30 S1=36874 S2=36875 S3=36876 S4=36877 V=36878
50 PRINT "████████PITCHES"
60 PRINT "███||||||||||||||||||"
62 PRINT"██VOICES.
63 PRINT"████-S1-----------------"
64 PRINT"████-S2-----------------"
65 PRINT"████-S3-----------------"
66 PRINT"████-S4-----------------"
67 PRINT"██▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀"
68 PRINT"███KILL TONE WITH PEN
   AND A KEY IN THIS TAB"
70 POKEV,4
75 WAIT37137,16
76 IFFNY(Y)=10THENP=S1
77 IFFNY(Y)=13THENP=S2
78 IFFNY(Y)=16THENP=S3
79 IFFNY(Y)=19THENP=S4
81 IFFNX(X)=3THENPOKEP,135
82 IFFNX(X)=4THENPOKEP,147
84 IFFNX(X)=5THENPOKEP,159
86 IFFNX(X)=6THENPOKEP,163
88 IFFNX(X)=7THENPOKEP,175
90 IFFNX(X)=8THENPOKES1,183
92 IFFNX(X)=9THENPOKEP,191
94 IFFNX(X)=10THENPOKEP,195
96 IFFNX(X)=11THENPOKEP,201
98 IFFNX(X)=12THENPOKEP,207
100 IFFNX(X)=13THENPOKEP,209
102 IFFNX(X)=14THENPOKEP,215
104 IFFNX(X)=15THENPOKEP,219
106 IFFNX(X)=16THENPOKEP,223
108 IFFNX(X)=17THENPOKEP,225
110 IFFNX(X)=18THENPOKEP,228
112 IFFNX(X)=19THENPOKEP,231
200 GETS$ IFS$=""THEN75
220 POKES1,0 POKES2,0 POKES3,
    0 POKES4,0 GOTO75
READY.
```

Polypen
by R Barton

Sound Explorer

on BBC Micro

With all the sophistication of the *Sound* and *Envelope* commands on the BBC Micro it is no easy task to find the exact parameters which give the sound you want.

This program lets you instantly hear the effect of changing any *Sound* or *Envelope* parameter.

You have a full screen display of all the current values and can raise or lower any one of them at the touch of a key.

```
1 REM COPYRIGHT (C) JULY 1962 by D.GUEST
10 MODE7
20 @%=5
30 PROCMENU
40 ON ERROR GOTO 660
50 DATA Pitch,Duration,Time-Base,FREQ-VAR 1,FREQ-VAR 2,
   FREQ-VAR 3,FREQ-TIME 1
52 DATA FREQ-TIME 2,PREO-TIME 3,Attack.Decay,Sustain,
   Release,Amp-Level 1
54 DATA Amp-LeveI 2
59 REM ** A SELECTION OF INITIAL VALUES FOR ENVELOPE
60 DATA 100,50,4,4,-8,-4,16,16,32,64,64,64,64,128,0
70 DIM E%(14),E$(14)
```

```
80 FOR I%=0 TO 14:READ E$(I%):NEXT
90 FOR I%=0 TO 14:READ E%(I%):NEXT
95 EMAX%=255:EMIN%=-127
100 PROCTEXT
110 *FX11,10
120 *FX12,5
130 *FX4,1
140 FOR C%=0 TO 14:PROCPVAL:NEXT
150 PRINT TAB(28,0);
160 C%=0
170 REM
180 REPEAT
190     NV=FALSE
200     G%=GET
210     IF G%=32 THEN PROCPLAY
220     IF G%=139 THEN PROCUP
230     IF G%=138 THEN PROCDOWN
240     IF G%=137 THEN PROCINC
250     IF G%=136 THEN PROCDEC
260     IF NV=TRUE THEN PROCPVAL
270 UNTIL G%=81
279 REM ** TYPING 'Q' WILL END PROGRAM
280 *FX12,0
290 *FX4,0
300 CLS
310 END
320 REM
330 DEFPROCUP
340     IF C% > 0 THEN C%=C%-1:VDU11
350 E.
360 DEFPROCDOWN
370     IF C% < 14 THEN C%=C%+1:VDU10
380 E.
390 DEFPROCINC
400     IF E%(C%)<EMAX% THEN
        E%(C%)=E%(C%)+1:NV=TRUE
410 E.
420 DEFPROCDEC
430     IF E%(C%)>EMIN% THEN
        E%(C%)=E%(C%)-1:NV=TRUE
440 E.
450 DEFPROCPLAY
460 ENV. 1,E%(2),E%(3),E%(4),E%(5),E%(6),
E%(7).E%(8),E%(9),E%(10),E%(11),E%(12),
E%(13),E%(14)
470 SOUND S%,1,E%(0),E%(1)
479 REM ** ONE SECOND DELAY BEFORE
    FURTHER KEYSTROKES ARE ACCEPTED
480 TIME=0:REPEAT UNTIL TIME=100
490 *FX15,1
500 R.
510 DEFPROCPVAL
520     PRINT TAB(28,C%)E%(C%);
        :PRINT TAB(28,C%);
530 E.
540 DEFPROCTEXT
550     CLS
560     FOR I=0 TO 1:PRINT CHR$131;
        "SOUND": NEXT
570     FOR I=2 TO 14:PRINT CHR$129;
        "ENV.": NEXT
580     FOR I=0 TO 14:PRINT
        TAB(25-LEN(E$(I),I);E$(I): NEXT
590     PRINT TAB(0,16);CHR$131:"SOUND ";
        CHAN$;",1,Pitch,Duration"
600     PRINT TAB(0,17);CHR$129;
        "ENV. 1.T,P1,F2,F3.T1,T2,T3"
```

Sound Explorer
by D Guest

to next page

from previous page

```
610     PRINT TAB(10,18);CHR$129;"A,D,S,R,L1,L2"
620     PRINT TAB(0,20);" Use cursor keys - up & down to select,'
630     PRINT TAB(0,21);" side to side to vary values."
640     PRINT TAB(0,24);CHR$&84;CHR$&9D;
650     PRINT TAB(5,24);CHR$&87;"PRESS SPACE BAR TO HEAR SOUND"
660 E.
670 REM ERROR ROUTINE
680 *FX4,0
690 *FX12,0
700 CLS
710 REPORT:PRINT " at line ";ERL
720 END
730 REM
740 DEFPROCMENU
750 PRINT "SOUND EXPLORER
760 PRINT "This program allows you to explore"
770 PRINT "the SOUND and ENVELOPE commands."'
780 PRINT "All current parameters are displayed"
790 PRINT "on the screen and any parameter can be"
800 PRINT "selected and varied up or down."
810 PRINT "The current sound can be played at any"
820 PRINT "time by pressing the space bar."
830 PRINT ''"Select SOUND CHANNEL 0 or 1"
840 REPEAT:G%=GET: UNTIL G%=48 OR G%=49
849 REM ** BYTE 2 OF CHANNEL PARAMETER IS SET TO
    FLUSH PREVIOUS SOUND
850 CHAN$="&1"+CHR$G%:S%=G%-32
860 E.
```

Spectrum

In this new slot various contributors explore different aspects of the ZX Spectrum

Patterns to swim before your eyes

John Scriven reveals a hidden generator for moiré patterns.

The Spectrum is already starting to reveal some interesting secrets. One of these is the hidden pattern generator shown in the following program (Program 1). Due to the way the *Draw* and *Plot* routines operate, moiré patterns are produced on pressing the cursor keys. The effects are similar to the interference patterns you see on net curtains.

It is possible to fill the screen completely but Program 2 will do that for you. The pleasing thing for Sinclair owners is that the program can be squashed into one line — I recently saw a similar program on an Apple II that was nearly 50 lines long.

If you have experience of a ZX81, then you must have come across many 'Sketchpad' programs. On a Spectrum, the results are much better though, with 45,056 plot positions, it can be difficult finding your exact screen location. Program 3 shows one way of achieving reasonable results. The controls are as follows:

QWE
ASD
ZXC
— Direction of plot
0 Copy picture
1 Save picture
2 Unplot
8 Plot
9 change colour

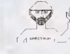
The *Screen* saving routine is quite impressive. In addition to saving any group of bytes together, such as user-defined graphics, the whole screen can be saved using either *Save "x" Code* 16384, 6912 ("x" being the name you choose: 16384 being the memory location of the start and 6912 being the total number of bytes involved) or more simply *Save "x" Screen*. When reloading the picture is built up each dot in turn, before your very eyes. (To load simply enter load "x" *Code*.)

Due to the peculiar memory map the screen loads in sections of eight lines one row of a character block at a time. If this baffles you try Program 4. This fills the screen in the order in which the data is stored in memory. From 22528 to 23296 the attributes such as colour and brightness are filled in.

```
 5 REM MOIRE2 © John Scriven
 10 OVER 1: FOR a=0 TO 1: FOR b=0 TO 255: PLOT 0,175*a: DRAW b,175-350*a: PLOT 255,175*a: DRAW -b,175-350*a: NEXT b: NEXT a: GO TO 10
```

PROGRAM 2






```
  1 REM MOIRE © John Scriven
 10 INK RND*7: PAPER RND*7: BORDER RND*7: CLS
110 LET a=0: LET b=0
130 IF INKEY$="7" THEN LET b=b+1
140 IF INKEY$="" THEN GO TO 140
150 IF INKEY$="8" THEN LET a=a+1
160 IF INKEY$="5" THEN LET a=a-1
170 IF INKEY$="6" THEN LET b=b-1
180 IF INKEY$="7" THEN LET b=b+1
190 IF a>125 THEN LET a=125
195 IF a<-255 THEN LET a=-255
200 IF b>87 THEN LET b=87
205 IF b<-175 THEN LET b=-175
210 PLOT a,b
220 DRAW a,b
250 GO TO 140
```

PROGRAM 1

```
  5 REM Sketchpad ©John Scriven
 20 INK 0: PAPER 7: BORDER 0: CLS
 30 INPUT "choose background colour(0-7)";bc
 40 PAPER bc: CLS
 50 INPUT "A name for your picture";n$
100 LET a=20: LET b=20
105 LET c=0: LET x=0
110 PLOT a,b: PLOT OVER x;c,a,b
120 LET a=a+(INKEY$="e")+(INKEY$="d")+(INKEY$="c")
130 LET a=a-(INKEY$="q")-(INKEY$="a")-(INKEY$="z")
140 LET b=b+(INKEY$="q")+(INKEY$="w")+(INKEY$="e")
150 LET b=b-(INKEY$="z")-(INKEY$="x")-(INKEY$="c")
160 IF INKEY$="9" THEN INK RND*7
170 IF INKEY$="1" THEN SAVE n$ SCREEN$
180 IF INKEY$="0" THEN COPY
190 IF INKEY$="8" THEN LET x=0
200 IF INKEY$="2" THEN LET c=1
210 IF a<0 THEN LET a=0
220 IF a>255 THEN LET a=255
230 IF b<0 THEN LET b=0
240 IF b>175 THEN LET b=175
250 GO TO 110
```

PROGRAM 3

```
10 REM SCREENFILL©John Scriven
20 FOR n=16384 TO 23296
30 POKE n,RND*255
40 NEXT n
```

PROGRAM 4

Sound & vision



Who will compare the show?

This program plays the song *A Little Peace*, winner of this year's Eurovision Song Contest, on the Vic20. The program uses two part harmony and consists almost entirely of data statements.

Line 10 sets the volume to five. You can adjust the volume to suit your own tastes. Line 20 simply allows the tune to be played twice, or more often if you wish.

Line 40 is a time delay for the basic note value. Lines 50 and 60 determine whether the tune is being played for the first or second time.

The remaining lines are data statements which play the tune.

Andy Horrell

```
0 REM                              A LITTLE PEACE
10 POKE36878,5 PRINT"J"
15 PRINTTAB(4)"▓▓▓▓▓▓▓A LITTLE PEACE"
18 PRINT"▓(EIN BISSCHEN FRIEDEN)"
20 FORP=1TO2 RESTORE
30 READB,M POKE36875,B POKE36876,M
40 FORT=1TO200 NEXT
50 IFB=1THENNEXT GOTO30
60 IFB=2THENEND
70 GOTO30
110 DATA191,0,191,0,0,0,195,0,201,0
120 DATA201 223,201,223,0,223,201,223,207,223,201,219,212,219
130 DATA212,225,212,225,0,225,212,225,212,225,212,225,215,212,219,212
140 DATA219,219,0,219,219,219 215,219,212,219,212,219,207,201,207,201
150 DATA0,215,201,215,201,215,191,0,0,0,191,0,195,0,201,0
160 DATA201,223,201,223,0,223,201,223,207,223,207,223,201,219,212,219
170 DATA212,225 212,225,0,225,212,225,0,225,212,225,215,212,219,212
180 DATA219,219,0,219,219,219,215,219,223,219,223,219,219,201,215,201
190 DATA215 215,215,215,215,215,0,215,0,215,0,0,0,0
200 DATA0,201,175,201,0,201,175,215,201,215,201,215,201,0,201,215
210 DATA147,212 147,215,0,219,147,201,183,201,183,201,183,201,183,0
220 DATA147,201,147,201,0,201,147,219,183,219,103,219,183,0,183,219
230 DATA175,215,175,219,0,223,175,201,201,201,201,201,201,201,201,0
240 DATA175,201 175 201,0,201,175,223,201,223,201,223,201,0,201,223
250 DATA135 219,135,223,0,225 135,207,175,207,175,207,175,0,175,207
260 DATA147,201,147,201,0,201,147,223,183,223,103,223,183,219,183,219
270 DATA175,215,175,215,0,215,175,215,175,0,175,0,147,0,135,0
280 DATA191 0,191 0,191,0,1,0
300 DATA191 175,0,0,191 175,195,103,201,191
310 DATA201,191,0,0,201,191,215,191,0,0,215,191,219,195,223,201
320 DATA223,201,0,0,223,201 223,207,223,207,223,201,223,201
330 DATA228,223,228,223,228,223,228,223,228,223,2,0
```

Programming

From little Acorns grow mighty . . .

***Paul Howard** explains how to add 16K Ram to the BBC model A.*

The BBC microcomputer has proved to be very popular and although beset by delivery problems, many people are now established users of this machine. But, the various difficulties encountered in the early manufacture and distribution of the computer has meant that the majority of the machines in use are model As. This has led many users to think about the possibility of a "do-it-yourself" upgrade.

One of the major differences between the two models is the extra 16K of random access memory available on the model B. The model B, with 32K, not only provides space for larger programs but also has four extra modes available. Only with the full 32K can all the features of the graphics be exploited, to give higher resolution and more colour facilities.

The upgrading of a model A to 32K is a relatively easy task. Only eight extra integrated circuits are needed and no soldering is required. Anyone wishing to perform the upgrade themselves should have no difficulty, provided that a few simple instructions are followed and the computer and components are handled carefully. However, it should be remembered that undertaking a "do-it-yourself" upgrade may invalidate the six month guarantee provided by Acorn.

The components required are eight 4816A dynamic Ram chips, available by mail-order from many of the larger electronic component retailers (eg, Watford Electronics, Technomatic Ltd) at a cost of approximately £2-£3 each.

These particular integrated circuits are susceptible to the affects of static electricity. The pins should not be touched as this could damage them permanently. The work surface should be clean and dry, as should your hands. It is also a good idea to leave the memory chips in their protective packaging until they are required, and then to handle them as little as possible.

Prior to starting the upgrade, make absolutely sure that the computer is disconnected from the mains supply — unplug it. Also remove the TV and cassette leads from their connectors.

The case cover can now be removed by unfastening the four screws securing the cover to the base. Two screws are located on the rear panel and two are underneath, at the front — they are all labelled "FIX". The top cover can now be lifted away, but be careful with the three red LED indicators. These simply push through holes in the plastic near the keyboard opening and could easily be broken if forced.

The eight sockets for the extra memory are located in the front right hand corner of the main printed circuit board. These sockets can be identified by the legend printed alongside each one and are numbered IC61, IC62, etc, up to and including IC68. Simply insert the eight memory chips into these sockets, making sure that the small D-shaped indentation in the end of each chip is facing towards the rear of the computer (ie pin number 1 to the rear) similar to the ones already fixed in place. Be very careful when pushing the chips in, as the pins can easily bend, or miss the holes in the sockets.

The only other alteration concerns a connecting link labelled "S25". It is located about 10cm from the rear of the computer, on the right hand side of the printed circuit board to the left of IC45. Pull the black plastic plug from the connector and you will see three pins in a line. Reconnect the plug to the rear and centre pins of this connector — it was previously across the centre and front pins.

The cover can now be replaced, making sure that the three LEDs are located properly in their respective holes in the cover and that all four screws are secured. Reconnect the lead to the TV and plug the computer into the mains supply. When you switch on the screen should display

```
BBC Computer 32K
BASIC
>_
```

If you do not get this response then there is a problem somewhere. Check that the new memory chips are pushed well into their sockets and that all the pins are making good contact. Try removing them carefully and examining the pins — if they are bent then carefully straighten and re-insert them into the sockets, ensuring that they are the correct way round. Also check that the S25 connecting plug is making good contact between the centre and rear pins of the connector. If you still have no joy when switching on then the integrated circuits may be faulty and should be returned to the retailer.

If everything has worked successfully you now have 32K of Ram available, giving all the software features of a model B. Any programs written for a model B, which do not use any of the extra input/output hardware, will now run in this upgraded version of a model A.



BBC micro model B with extra 16K of access memory

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer.

HELP ME TO THE RIGHT ADDRESS

Imtiaz Hussain of Tweedale Street, Rochdale Lancashire writes

Q **I have had my ZX81 for about nine months, but found that it was too limited for my purposes. Recently, I bought a Vic20. But, many of the programs I write for the ZX81 have a lot of *Peek* and *Poke* statements.**

Could you please make a list of Vic20 *Peek* and *Poke* numbers, as compared to those of the ZX81 and the Pet. For example the *Poke* number 32768 on a Pet is the same as 32807 on the Vic, but what is it on the ZX81? Please could you also include the small numbers. I am sure that a lot of people who want to change their programs between these computers will find it very useful

A It is very difficult, if not impossible, to list the compatible addresses between the ZX81 and the Vic or the Pet. The Vic can access up to 64K, giving a potential maximum of 65535 addresses, all of which can be *Peeked*

A thorough breakdown of the Vic map takes up nine pages of Nick Hampshire's book *The Vic Revealed*. If you want a memory map of the Pet, then look at *Best of the UK Commodore Pet newsletter* a compilation of volumes one and two, edited by Dave Middleton, which has 27 pages of Pet memory maps at the back. This is available for £7 50 from Commodore Computing, Hobhouse Court, 19 Whitcomb Street, London WC2

The ZX manual gives quite a good breakdown of the accessible portions of the variable memory. *Byteing Deeper into your ZX81* by Mark Harrison gives a short but concise overview of the ZX81 memory map as a whole

In some cases translation is comparatively simple. For example, *Membot* is 16477 on a ZX81 and 65436 on a Vic. But the two dialects of Basic are very often difficult to translate. The screen location of 7787 can be *Poked* on an unexpanded Vic with no problem. On a ZX81 that address is part of the dollar sign character. As this is part of the ZX81's Rom, it certainly cannot be accessed by a *Poke* command.

SOMEBODY GIVE ME A SIGN

Veronica Griffiths of 34 Clayponds Avenue, Brentford Middlesex, writes

Q **I have a ZX81 with 16K Ram. I am working my way through the book *30 hour Basic* and am doing quite well. But, I would like to get my ZX81 to help me with my other hobby, Astrology, which involves many calculations.**

I wrote to Roger Elliot of *Star Life* and got a very helpful letter back. Unfortunately, I do not feel that my knowledge of computing is good enough. Is there anything you can do to help, or do you know where I could contact someone who could act as a middleman/woman?

A I feel that your best chance at the moment is to develop your ZX81 as an aid for various sections of your astrological calculations. A typical program could include (1) Sidereal time, GMT, (2) ST, GMT + Eastern time zones, (3) ST, GMT + Western time zones, (4) Position of Mercury and so on

The major problem is that hours, minutes and seconds are calculated in base 60. The following sub-routine will work out Sidereal time GMT though you will still need to use an ephemeris

```
10 PRINT "HOURS MINUTES
   SECONDS"
20 INPUT H1
30 INPUT M1
40 INPUT S1
45 PRINT H1
   "spaces" M1 "spaces" S1
50 IF H1 > 12 THEN LET
   N1=H1-12
60 IF H1 < 12 THEN LET
   N1=12-H1
70 INPUT H2
80 INPUT M2
90 INPUT S2
95 PRINT
   H2 "spaces";M2; "spaces";S2
110 LET S3=S1+S2
120 LET M3=M1+M2
130 LET H3=N1+H2
140 IF S3>=60 THEN GOSUB 200
150 IF M3>=60 THEN GOSUB 220
160 PRINT
   H3 "spaces";M3;"spaces";S3
175 STOP
200 LET S3=S3-60
210 LET M3=M3+1
215 RETURN
220 LET M3=M3-60
230 LET H3=H3+1
235 RETURN
```

Lines 20 to 45 input and print the time of birth. Lines 50 and 60 make the first part of the calculation by changing the hours to N1. Lines 70 to 95 input and print the sidereal time at noon. The routine can end with a *Goto* 160 which will print out the results.

This program assumes you were born after 12 am. If you were born before 12 am simply reverse all the arithmetic signs after line 110 which becomes LET S3=S1−S2

I have used Louis MacNeice's book *Astrology* as a reference, but unfortunately it does not give sufficient information to actually work out the orbits of the planets. This is a long term aim that you are more likely to achieve if you upgrade from a ZX81. Remember, if you attempt this sort of calculation on a ZX81, or a Spectrum, do not forget that it works in radians, not degrees

As to whether there is anyone who can help you. Have you considered looking for a local computer club? Alternatively, you might find a visit to your local library or an advertisement in a local paper will pay dividends

IT MAY BE IN CODE

Paul Frewin, of Wadebridge, Cornwall writes

Q **I have been waiting for my Spectrum for six weeks. I have read in a number of reviews that the main disadvantage of the Spectrum is that it is very slow. This slowness has prompted me to learn more about machine code.**

If a microcomputer uses a Z80 processor will it have the same mnemonics and hexadecimal codes as any other Z80 based micro? And will a book like Rodney Zaks *Programming your Z80* be compatible with the machine code of my ZX Spectrum?

A Whatever your reasons for learning machine code, it is a useful language to know. The Zaks book is considered by many to be the bible of Z80 programming, though you should note that both the Spectrum and the ZX81 use the Z80a chip which is a modified version of the Z80

The hex codes will remain the same for all Z80 based micros, as will the mnemonics. What does change is the way all the signals into and out of the chip are interpreted

A signal going into a chip at point A will produce a response at point B. It will always be the same response at the same point. However, where one micro might interpret this as an instruction to *Refresh* the Ram, another computer might see it as part of a *Print* command

One note about the Rodney Zaks book is that it is very expensive. It might be advisable to go on your library's no doubt long waiting list for the book. As an alternative you might try and get hold of a copy of Nat Wordsworth's *Z80 Instruction Handbook* which is published by Scelbi

BUT A STAR MAP IS OK

K Whitton of Bridgewater Close, Chislehurst, Kent, asks

Q **I have seen a program to generate a star map for use in astrology. Do you know of any similar, Basic programs, for the ZX81?**

A The only two programs I know of that might be of any use are astronomy programs. One by Helta-Skelta Software of Ferryside, Tookey Road, New Romney, Kent, deals with planetary paths. The other by Bug Byte, 98/100 The Albany, Old Hall Street, Liverpool L3, is called Constellation and will draw a map of the night sky for anywhere on the earth, for any time since 1900

Classified

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Competitions

Puzzle No 20

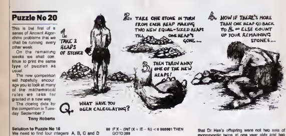
This is the first of a series of Ancient Algorithms problems that we shall be running every other week.

On the remaining weeks we shall continue to print the same type of puzzles as usual.

The new competition will hopefully encourage you to look at many of the mathematical rules we take for granted in a new way.

The closing date for the competition is Tuesday September 7.

Tony Roberts



Solution to Puzzle No 16

We need to find four integers A, B, C and D such that

$$A^3+B^3=C^3+D^3$$

The program generates three of the four variables A, B and C, calculates D and checks to see if D is a perfect cube.

```
10 FOR A = 11 TO 100
20 FOR B = 1 TO 100
30 FOR C = B + 1 TO 100
40 IF C = A THEN GOTO 90
50 LET Y = A*A*A + B*B*B - C*C*C
60 IF Y < 1 THEN GOTO 100
70 LET X = Y**(1/3)
80 IF X - (INT (X + 1E - 8)) < 0.000001 THEN
   GOTO 200
90 NEXT C
100 NEXT B
110 NEXT A
200 PRINT "A= ";A,"B= ";B;"C= ";C;"D= ";X,
   A*A*A + B*B*B
```

The smallest values are $9^3+10^3 = 12^3+1^3$. So Otto's new phone number is 1729.

Winner of Puzzle No 15

The winner is Ian Wilkinson, Silkstone View, Hoyland, Barnsley, South Yorkshire, who receives £10. He adds: The answer presupposes that Dr Hex's offspring were not two sets of monozygotic twins at one year olds and two year olds — leading to a phone number of 9.

Rules

The winner of the puzzle will be the reader who, in the opinion of *Popular Computing Weekly* has submitted the best solution. Preference will be given to solutions which show how the entrant arrives at the correct answer.

Envelopes containing entries should be marked clearly with PUZZLE.

A.R.T.H.U.R.

LITERARY CRITICISM

SEARCH BY NUMBER
FIND AND GLOSS

THREE BLIND MICE
TWO BLIND MICE
ONE BLIND MICE
ONE BLIND MICE

ONE BLINDS MICE

TWO BLINDS MICE

ONE BLINDS MICE
THE FARMERS WIFE
SHE BLINDS MICE
SEE HOW THEY RUN

SIX PROUD WALKERS
FIVE DAYS OF CHRISTMAS
FOUR AND TWENTY BLACKBIRDS
THREE BLIND MICE GO
ONE NOUN PHRASE
ONE NOUN PHRASE
PLEASE REPEAT
STOP BREAKS RULE
ALIGN NUMBER INDICATORS
STOP BREAKS RULE NO
GO OBEYS OTHER RULE
STOP BREAKS RULE
ALIGN NUMBER INDICATORS
WHO BLINDS MICE?
ONE NOUN PHRASE
THAT IS AGGRESSION
IMPERATIVE CLAUSE

SEE HOW THEY RUN
SEE HOW THEY RUN
THE FARMER'S WIFE
CUT OFF THEIR TAILS
WITH A CARVING KNIFE
DID YOU EVER SEE
DID YOU EVER SEE
DID YOU EVER SEE
DID YOU EVER SEE
SUCH A THING IN YOUR LIFE
AS THREE BLIND MICE
FOUR BLIND MICE
FIVE BLIND MICE
SIX BLIND MICE
SEVEN BLIND MICE
SEVEN BLIND MICE

FEAR BEHAVIOUR
USING LEGS
ONE NOUN PHRASE
MORE AGGRESSION
DIVERGENT THINKING
INTERROGATIVE
LISTENER INVOLVEMENT
LISTENER NOT BLIND
LISTENER NOT MICE
LISTENER ALIVE
ARE THEY SYMBOLS?
PLIGHT OF HUMANITY
POPULATION EXPLOSION
OUT OF CONTROL
SO AM I
INFINITE LOOP
SEE HOW I RUN
SEE HOW I RUN

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